





(DPS) Digital Pen Scanner



SIE 457
Group 22
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Agenda

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- Requirements
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Executive Summary

- The Digital Pen Scanner is designed to make work done easier and faster. It will have a translation feature that translates text into any different language the user needs in order to help deliver a better understanding of any material. It will also include a:
 - Microphone
 - Speaker
 - Headphones connector
- Our project requirements are designed to make the Pen Scanner convenient for users. (Further information in upcoming slides).
- The Project expected completion is on 11/4/21

Background

The Digital Pen Scanner is a problem solver. The reason we want to create a DPS is because it will help students like us achieve our goals faster.

As a team, we will follow a business strategy that brings success to the project. After we created the prototype, we used the NPS survey (Network Promoter Score) which is a survey conducted to obtain the percentage of customers rating the likelihood that they'd use or recommend a product. Our results came out with a 95% chance of consumers suggesting our product to others.

Our project promotes time-saving, something every busy full-time worker, student, even a stay-at-home parent can benefit from. A large audience falls under the project purpose and that is an indication that the impact of undergoing this project to be a success.

Project Objective

- The main objective of this design is to create a tool that uses the optical character recognition (OCR) to print text and transfer it to a device with an NTE of \$50,000. In addition, the pen scanner should facilitate the work for users by reducing the amount of work and time taken to achieve a goal. The main concept of the pen scanner is to make it ideal for students, teachers and professionals.

Requirements

- The DPS system shall read the selected text by the user.
- The DPS system shall be charged every 10 hrs.
- The DPS system shall be connected to Wi-Fi (3g,4g).
- The DPS system shall allow the user to scan text and transfer it the any device.
- The DPS system shall translate selected text to any language.
- The DPS system shall connect to wireless headphones through Bluetooth.
- The Digital Pen Scanner shall be available in two colors only “Gray and Black”.
- The Digital Pen Scanner product shall weigh 9 ounces.
- The Digital Pen Scanner shall be available online on Amazon.

Deliverables

- translation feature that will translate text into any different language the user needs to help deliver a better understanding of any material. It will also feature a microphone, speaker, and headphones connector.

The first step we'll take to accomplish this project is to draw a sketch of how the product will look. we will also create around 50 pieces as a start and each will cost 65 dollars. A marketing plan is already created by the organization.

Milestones

- Sketch delivered on May 25, 2021
- Ink cartridge delivered on June 5, 2021
- Digital camera delivered on June 8, 2021
- Communication unit delivered on June 11, 2021
- Product prototype documentation created on August 1st ,2021
- Review documents on August 25 ,2021
- Product testing done on Oct 20, 2021
- Rev 1 created on Oct 30, 2021
- Logo delivered on Nov 5, 2021
- design 50 pieces delivered on Jan 20, 2022
- Marketing plan created on Feb 27, 2022

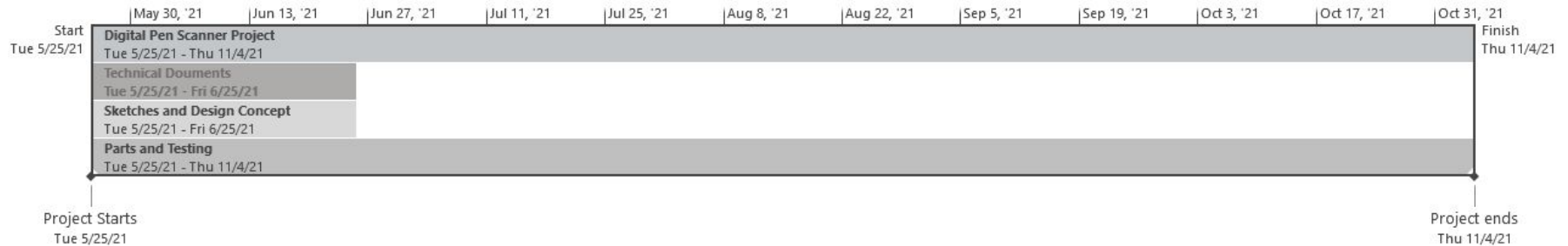
Work Breakdown Structure (1)

level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Work Package	Schedule	Predecessor
Wireless Pen Scanner	Documents	Technical documents	Requirements					
				Functional				
					Document main functional requirements	5 days		
					Determine software and objective requirements	4 days	6	
					Review	1 days	7	
				System				
					Identify constraints	1 day	8	
					Establish communication ability	2 days	8	
					Establish scanning and printability subsystem	2 days	8	
					Establish materials section	1 day	8	
			Sketches and Design Concept					
				Design Analysis				
					Develop 3 possible designs	4 days	6	
					Perform a Pugh Analysis on all 3 designs	2 days	6,16	
					Determine best possible design	1 day	8,17	
				Functional Block Diagram				
					Verify functional requirement	1 day	8	
					Determine blocks that will perform necessary functions	2 days	7	
				System Architecture				
					Determine and define subsystems	3 days	6	
					Create system and subsystem schematic	2 days	7	
				System Block Diagram				
					Identify important blocks of the pen scanner system	2 days	24	
					Create diagram accordingly	1 day	26	
				Trade Study				
					Research cost of materials	1 day	13	
					Identify mechanics of materials	2 days	13	
					Identify specifications of pen scanner	1 day	6	
					calculate pen scores for each design and for materials	1 day	17	
			Quality Assurance					
				Testing				
					Perform an analytical test on prototypes	5 days	32,10,8	
					Analyze test reports and identify possible errors	3 days	35	
				Risk Analysis				
					Identification and mitigation	6 days	23	
					Risk matrix	4 days	23, 38	
				Cost and Schedule Analysis				
					Determine suppliers and resources needed	3 days	38, 39	
					Create a Gantt Chart with deadlines	1 day	41	
					Determine lead times and overall budget	2 days	41, 42, 29	

Work Breakdown Structure (Cont. (2))

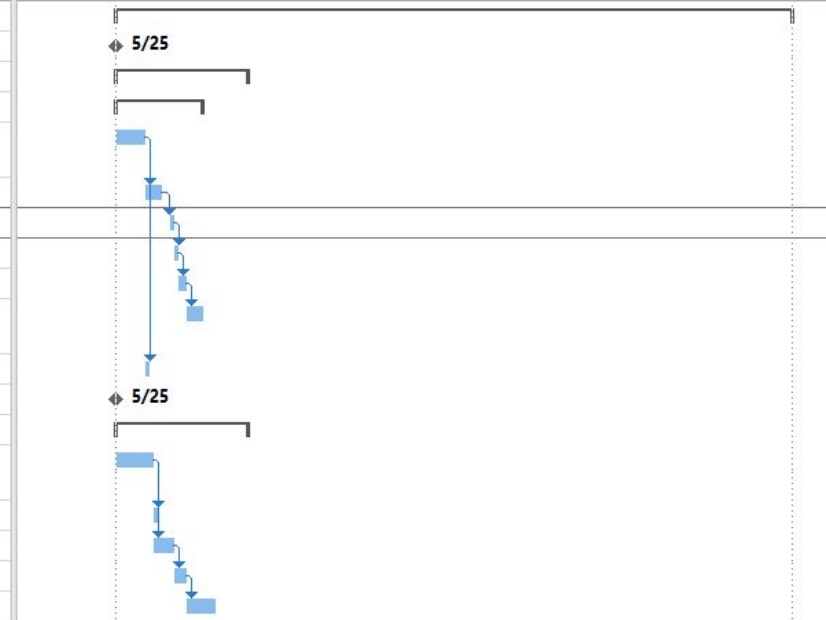
Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Work Package Schedule	Predecessor
Wireless Pen Scanner		User Manual	Create outline and first draft			2 days	
			Finalize manual			3 days	45
	Battery						
		Magnetic Charging unit					
		Power cord	Test battery life and charging duration			4 days	53
			Purchase power cord			3 days	
	Ink cartridge	Color recognition unit					
			Test system's color detection			20 days	57
			Purchase a comprised color detector			18 days	
			Test color detector			9 days	57
	digital camera scanner	Lens					
			Purchase Lens			18 days	
			Customize lens to a scanner specification				61
		Glass plate					
		Light bulb	test text scanner recognition			8 days	66
			Purchase light bulb			15 days	
	communication unit	Processor					
			Test device recognition to highlighted data, printing it over as an output to the connected device or on paper.			10 days	
		Data transmission unit					
			Purchase unit parts			15 days	
			Align unit parts and perform mechanical tests			7 days	70
			Inspect transmission communication with output/input device			10 days	70 & 71

Project Network/ Schedule Timeline



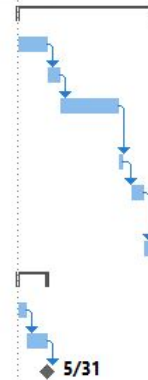
Critical Path and Total Timeline

1	➡	▸ Digital Pen Scanner Project	118 days	Tue 5/25/21	Thu 11/4/21	
2	➡	Project Starts	0 days	Tue 5/25/21	Tue 5/25/21	
3	➡	▸ Technical Documents	24 days	Tue 5/25/21	Fri 6/25/21	
4	➡	▸ Requirements	15 days	Tue 5/25/21	Mon 6/14/21	
5	➡	Determine main functional requirements	5 days	Tue 5/25/21	Mon 5/31/21	
6	➡	document software requirements	4 days	Tue 6/1/21	Fri 6/4/21	5
7	➡	Review functional documents	1 day	Mon 6/7/21	Mon 6/7/21	6
8	➡	identify constraints	1 day	Tue 6/8/21	Tue 6/8/21	7
9	➡	Establish communication ability	2 days	Wed 6/9/21	Thu 6/10/21	8
10	➡	establish scanning and printability subsystem	2 days	Fri 6/11/21	Mon 6/14/21	9
11	➡	establish material needed	1 day	Tue 6/1/21	Tue 6/1/21	5
12	➡	Designing Phase Begins	0 days	Tue 5/25/21	Tue 5/25/21	
13	➡	▸ Sketches and Design Concept	24 days	Tue 5/25/21	Fri 6/25/21	
14	➡	Develop 3 designs and verify the preferred one through	7 days	Tue 5/25/21	Wed 6/2/21	
15	➡	verify functional requirements	1 day	Thu 6/3/21	Thu 6/3/21	14
16	➡	determine and define subsystem	3 days	Thu 6/3/21	Mon 6/7/21	14
17	➡	create system block diagram	3 days	Tue 6/8/21	Thu 6/10/21	16
18	➡	Research cost materials	5 days	Fri 6/11/21	Thu 6/17/21	17



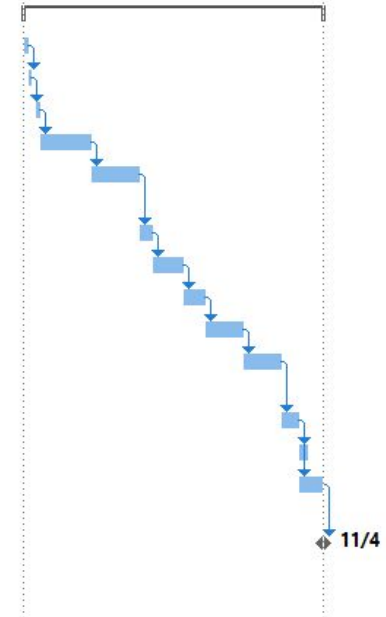
Critical Path and Total Timeline (Cont.2)

19		Quality Assurance	24 days	Tue 5/25/21	Fri 6/25/21	
20		Perform analytical test on products	5 days	Tue 5/25/21	Mon 5/31/21	
21		Analyze reports	3 days	Tue 6/1/21	Thu 6/3/21	20
22		Create risk matrix and risk mitigation	10 days	Fri 6/4/21	Thu 6/17/21	21
23		Create gantt chart	1 day	Fri 6/18/21	Fri 6/18/21	22
24		Determine resources and suppliers	3 days	Mon 6/21/21	Wed 6/23/21	23
25		determine lead times and buy	2 days	Thu 6/24/21	Fri 6/25/21	24
26		User Manual	5 days	Tue 5/25/21	Mon 5/31/21	
27		Create outline and first draft	2 days	Tue 5/25/21	Wed 5/26/21	
28		finalize manual	3 days	Thu 5/27/21	Mon 5/31/21	27
29		Ordering Parts Begin	0 days	Mon 5/31/21	Mon 5/31/21	28



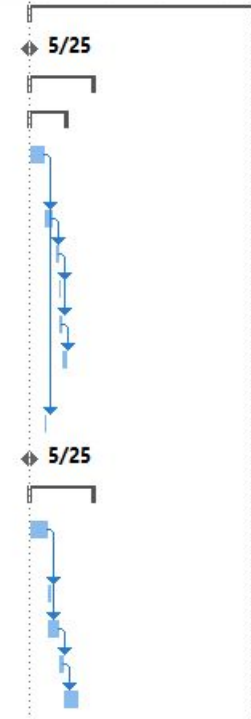
Critical Path and Total Timeline (Cont.3)

30	→	▶ Parts and Testing	118 days	Tue 5/25/21	Thu 11/4/21	
31	→	Test battery life	2 days	Tue 5/25/21	Wed 5/26/21	
32	→	Test charging duration	2 days	Thu 5/27/21	Fri 5/28/21	31
33	→	Purchase power cord	3 days	Mon 5/31/21	Wed 6/2/21	32
34	→	Test color recognition unit system	20 days	Thu 6/3/21	Wed 6/30/21	33
35	→	purchase compressed color recognition unit	18 days	Thu 7/1/21	Mon 7/26/21	34
36	→	Purchase Lens	5 days	Tue 7/27/21	Mon 8/2/21	35
37	→	Customize lens specifications	13 days	Tue 8/3/21	Thu 8/19/21	36
38	→	Purchase light bulb	8 days	Fri 8/20/21	Tue 8/31/21	37
39	→	test lights text scanner recognition	15 days	Wed 9/1/21	Tue 9/21/21	38
40	→	Purchase processor and data transmission units	15 days	Wed 9/22/21	Tue 10/12/21	39
41	→	Align unit parts	7 days	Wed 10/13/21	Thu 10/21/21	40
42	→	Perform mechanical test	3 days	Fri 10/22/21	Tue 10/26/21	41
43	→	inspect transmission communication (output/input)	10 days	Fri 10/22/21	Thu 11/4/21	41
44	→	Project ends	0 days	Thu 11/4/21	Thu 11/4/21	43



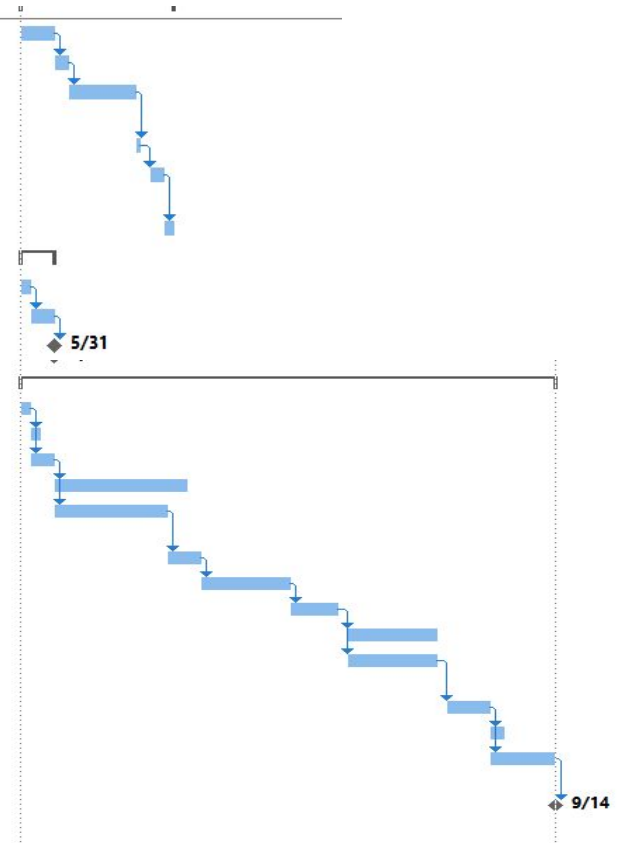
Reduced Duration Schedule

1	▲ Digital Pen Scanner Project	81 days	Tue 5/25/21	Tue 9/14/21		
2	Project Starts	0 days	Tue 5/25/21	Tue 5/25/21		
3	▲ Technical Documents	24 days	Tue 5/25/21	Fri 6/25/21		
4	▲ Requirements	14 days	Tue 5/25/21	Fri 6/11/21		
5	Determine main functional requirements	5 days	Tue 5/25/21	Mon 5/31/21		
6	document software requirements	4 days	Tue 6/1/21	Fri 6/4/21	5	
7	Review functional documents	1 day	Mon 6/7/21	Mon 6/7/21	6	
8	identify constraints	1 day	Tue 6/8/21	Tue 6/8/21	7	
9	Establish communication ability	2 days	Tue 6/8/21	Wed 6/9/21	7	
10	establish scanning and printability subsystem	2 days	Thu 6/10/21	Fri 6/11/21	9	
11	establish material needed	1 day	Tue 6/1/21	Tue 6/1/21	5	
12	Designing Phase Begins	0 days	Tue 5/25/21	Tue 5/25/21		
13	▲ Sketches and Design Concept	24 days	Tue 5/25/21	Fri 6/25/21		
14	Develop 3 designs and verify the preferred one through	7 days	Tue 5/25/21	Wed 6/2/21		
15	verify functional requirements	1 day	Thu 6/3/21	Thu 6/3/21	14	
16	determine and define subsystem	3 days	Thu 6/3/21	Mon 6/7/21	14	
17	create system block diagram	3 days	Tue 6/8/21	Thu 6/10/21	16	
18	Research cost materials	5 days	Fri 6/11/21	Thu 6/17/21	17	



Reduced Duration Schedule (Cont.2)

		Quality Assurance	24 days	Tue 5/25/21	Mon 5/31/21	
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24		Determine resources and suppliers	3 days	Mon 6/21/21	Wed 6/23/21	23
25		determine lead times and bu	2 days	Thu 6/24/21	Fri 6/25/21	24
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44		Project ends	0 days	Tue 9/14/21	Tue 9/14/21	43



Stakeholder Analysis

- Intellectual Property Owners - The inventors of the Pen Scanner who hold the Patent of the product.
- Employees - Engineers who design and build prototypes, as well as manufacturing department who will supply the product.
- Amazon - Platform of which the product will be exclusively sold at.
- Facebook - Marketing Campaign
- Graphic Designer - For packaging and marketing.

Stakeholder Analysis - Communication Plan

- **Employees:**
 - A weekly meeting with all Engineers every Monday starting May 3rd 2021.
 - A weekly meeting with all manufacturers every Wednesday Starting May 5th 2021.
- **Amazon:**
 - Meeting with Amazon directors to sit plan on selling and shares to be by August 30th 2021.
- **Facebook:** Marketing Campaigns are to be done 100% online.
 - A meeting with marketing interns on February 27th 2022 to create marketing campaign.
 - Marketing campaign to be live on March 1st 2022.
 - Semi-weekly meeting with marketing interns to have a progress report discussed on marketing campaign starting March 14th 2022.

Project Team

Our team has three different engineering departments:

- Electrical Engineer
- Software Engineer
- Industrial Engineer
- Marketing Interns

Responsibility Matrix

Taskss	Electrical Engineers	Software Engineers	Marketing Interns	Industrial Engineers
Building	R	R	I	C,I
Developing	A	A	I	C,I
Testing	R	A	I	C,I
Marketing	C	C	R	R

R: Responsible A: Accountable C: Consulted I: Informed

Project Risk

Risk Register					
Risk #	Description	Category	Probability (P) (0.0-1.0)	Impact (I) (0.0-1.0)	Risk Factor (P x I)
1	Inaccurate measurements for prototype	Design of Digital Pen Scanner	0.2	0.2	0.04
2	Scope creep consumes project scope	Schedule	0.4	0.4	0.16
3	Schedulling the timeline inaccuretly	Schedule	0.2	0.4	0.08
4	Delays in implementing the project	Schedule	0.4	0.8	0.32
5	Users reject the product	Communication	0.6	1	0.6
6	Resources are inexperienced	Communication	0.6	0.6	0.36
7	Underestimation of budget	Budget	0.8	0.6	0.48
8	Design is not fit for purpose	Quality	0.6	0.8	0.48
9	Design lacks flexibility	Change Request	0.2	0.6	0.12
10	Technology components lack stability	Development	0.4	0.6	0.24
11	Technology components are not reliable	Design of Digital Pen Scanner	0.2	0.8	0.16
12	Inadequate time for testing the Digital Pen Scanner	Schedule	0.2	0.8	0.16
13	Conflicts between stakeholders	Communication	0.6	0.4	0.24
14	Potential legal actions such as intellectual property	Legal	0.4	1	0.4
15	Requirements fail to align with product purpose	Design of Digital Pen Scanner	0.5	1	0.5

Risk Matrix



Success Criteria

The success criteria our project will demonstrate is as follows:

- Survey Evaluation From Customers.
- Developing The Product (Digital Pen Scanner Generation 1.0, 2.0, 3.0.. x).
- Re-evaluating Marketing Campaigns.

Summary

This project is a problem solving statement. It addresses an ongoing issue between the conflict of the physical world and the technical world. The targeted audience that comes across this dilemma can have their problem solved by conducting this project successfully.

The Digital Pen Scanner project has a strong fundamental, as its basis is built on an intellectual property and a patent which secures the invention. Thus ensuring a successful project with a sales projection of at least 1 million dollars in revenue by 2023. And \$400,000 in gross profit.

Any Questions?